

## **REMARKS**

### ***In the Specification***

The second paragraph on page 2 under the “Background Art” section is amended to include additional background information regarding the “raw key” and the “sifted key.”

The first full paragraph on page 5 is amended to correct a typographical error.

***In the Claims***

Claims 1-9 were pending in the application and all were rejected.

Claims 1, 5, 8 and 9 are amended herein, and new claims 10-13 have been added.

Support for claim 10 is found in FIG. 2 and in paragraphs [0027] and [0028] of the published Application (U.S. Pat. App. Pub. No. US2007/0140495 A1).

Support for claim 11 is found in paragraph [0025].

Support for claim 12 is found in FIG. 1 and paragraph [0016].

Support for claim 13 is found in paragraph [0036].

**Rejection under 35 USC § 103**

Claims 1 and 9 were rejected over U.S. Patent No. 5,757,912 to Blow ("Blow") in view of U.S. Patent Application Publication No. 2002/0106084 A1 to Azuma ("Azuma"). Further, claims 2-7 were rejected further in view of Applied Cryptography by Bruce Schneier ("Schneier").

The crux of the rejection of claims 1-9 lie in Azuma, which as the Examiner points out, is directed to encrypting qubits. While Azuma is a rather complex invention, the following paragraph taken directly from Azuma summarizes the aspect of the invention that is most relevant to Applicant's invention (see next page):

[0013] According to one aspect of the present invention, there is provided an encryption method comprising:

[0014] the acquisition step of inputting arbitrary quantum information and acquiring information of a quantum two-state system as a qubit by performing a computation in consideration of a physical system;

[0015] the first encryption step of encrypting the qubit acquired in the acquisition step;

[0016] the adding step of adding to the encrypted qubit a quantum system having signature information for guaranteeing that the qubit is really transferred from a sender to a recipient; and

[0017] the second encryption step of encrypting the quantum to which the quantum system having the signature information is added.

Azuma involves *first* forming a qubit, and then *afterward* encrypting the qubit via a *number of different encryption steps*. This approach leaves a period of time where the qubit remains unencrypted, and also calls for multiple post-encryption steps.

In quantum cryptography, a standard assumption made by those skilled in the art is that an eavesdropper has infinite resources and is only limited in their eavesdropping ability by the laws of physics. This, a person skilled in the art would understand that the time period for which the qubit remains unencrypted in Azuma represents a significant security weakness in what is supposed to be a maximally secure key-formation system.

To avoid this weakness, Applicant's invention *never forms an unencrypted qubit*. The weak optical pulses used in Applicants invention initially contain no information and so are not yet qubits. *The weak optical pulses are then encoded in a manner that directly forms encrypted qubits*—that is to say, *there are no separate steps for first forming a qubit and then performing subsequent encryption steps to encrypt an existing qubit*.

In Applicant's invention, the encrypted qubit is formed in a *single step* where encryption and encoding occur simultaneously. This is the key difference between

Applicant's claimed invention and the prior art of Azuma.

Claims 1, 5, 8 and 9 have been amended to point out this key difference. Because all of the claim limitations in Applicant's presently claimed invention cannot be found in the combination of references cited, Applicant respectfully requests that the rejection of claims 1-13 be withdrawn.

## CONCLUSION

Applicant respectfully submits that in view of the above-described amendments to the claims, all of the claims, including new claims 10-13, are in condition for allowance.

The Examiner is encouraged to contact the Assignee's authorized representative at 941-378-2744 to discuss any questions that may arise in connection with this Amendment.

Respectfully Submitted,

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Date: January 28, 2008

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